

AMENDMENTS TO THE CLAIMS

The following listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) ~~Bone~~A bone implant (10) suitable for implantation in an implantation direction parallel to an implant axis (I) in a cavity surrounded by a cavity wall (K) of bone tissue (3), wherein an implant portion to be implanted comprises surface ranges (16) of a material, which is liquefiable (M) by mechanical oscillation, or such surface ranges (16) formed by pressing the liquefiable material out of a hollow space (26) in the implant through openings (27), ~~characterized in that~~ and wherein the implant portion to be implanted further comprises cutting edges (14), said ~~which~~ cutting edges being ~~are~~ located outside the surface ranges (16) provided or to be created, ~~which~~ said cutting edges do not extend in a common plane with the implant axis (I), and wherein the ~~which~~ cutting edges are facing toward a distal end region of the implant, ~~and which cutting edges~~ and extend at least partly around the circumference of the implant.

2. (Currently Amended) The bone ~~Bone~~ implant according to claim 1, ~~characterized in that~~ wherein the cutting edges (14) comprise a wedge angle (β) of less than 90°.

3. (Currently Amended) ~~Bone~~The bone implant according to claim 1, ~~wherein or 2, characterized in that~~ the cutting edges (14) are designed to be salient.

4. (Currently Amended) ~~Bone~~The bone implant according to ~~any one of claims 1 to 3, characterized in that~~ claim 1, wherein the cutting edges (14) are undercut to form a chip space (23).

5. (Currently Amended) ~~Bone~~The bone implant according to ~~any one of claims 1 to 4, characterized in that~~ claim 1, wherein the liquefiable material (M) is situated in depressions (40) and the surface ranges (16) of the liquefiable material (M) protrude from surface areas (17) surrounding the depressions (40).

6. (Currently Amended) ~~Bone~~The bone implant according to ~~any one of claims 1 to 4, characterized in that~~ claim 1, wherein the openings (27) lead into the depressions (40).

7. (Currently Amended) ~~Bone~~The bone implant according to ~~claim 5 or 6, characterized in that~~ claim 5, wherein the depressions (40) are grooves extending axially or spirally across the implant region to be implanted.

8. (Currently Amended) ~~Bone~~The bone implant according to ~~any one of claims 1 to 7, characterized in that~~ claim 1, wherein osseointegrative surface areas (17) are situated between the surface ranges (16) of the liquefiable material.

9. (Currently Amended) ~~Bone~~The bone implant according to ~~any one of claims 1 to 8, characterized in that claim 1, wherein~~ the implant portion to be implanted further comprises axially extending furrowing or tapping structures (21).

10. (Currently Amended) ~~Bone~~The bone implant according to ~~any one of claims 1 to 9, characterized in that claim 1, wherein~~ the cutting edges (14) extend along parts of the circumference of the implant and form lower edges of scale-like structures.

11. (Currently Amended) ~~Bone~~The bone implant according to ~~any one of claims 1 to 10, characterized in that claim 1, wherein~~ a proximal end region of the implant comprises a collar (31) with a lower edge fashioned as a cutting edge.

12. (Currently Amended) ~~Bone~~The bone implant according to ~~any one of claims 1 to 11, characterized in that claim 11, wherein~~ the proximal end region comprises a ring (32) of a thermoplastic material.

13. (Currently Amended) ~~Bone~~The bone implant according to ~~any one of claims 1 to 12, characterized in that claim 1, wherein~~ the implant portion to be implanted tapers toward ~~is of a shape tapering towards a distal end region.~~

14. (Currently Amended) ~~Bone~~The bone implant according to claim 13, ~~characterized in that it comprises~~ further comprising steps (13) extending wholly or

partly around the implant and comprising at least partially edges fashioned as cutting edges (14).

15. (Currently Amended) ~~Bone~~The bone implant according to claim 14, ~~characterized in that~~wherein a part of the steps (13) have blunt edges with a wedge angle (β) of 90° or more.

16. (Currently Amended) ~~Bone~~The bone implant according to ~~any one of claims 1 to 12, characterized in that~~claim 1, wherein the implant portion to be implanted has an ~~is~~-essentially cylindrical form and comprises cutting edges (14) protruding from the cylindrical form and being distanced from the implant axis (I) by distances which decrease in the direction of implantation.

17. (Currently Amended) ~~Bone~~The bone implant according to claim 16, ~~characterized in that~~wherein the cutting edges (14) protruding from the cylindrical form extend along a part of ~~the~~a circumference of the implant ~~implant's~~ ~~circumference~~ and are aligned in series in the axial direction.

18. (Currently Amended) ~~Bone~~The bone implant according to claim 17, ~~characterized in that it comprises~~further comprising at least two series of cutting edges (14, 14', 14'') facing each other, and ~~that~~wherein the surface ranges (16) of the liquefiable material (M) or outlets of the openings (27) are situated between the series on the implant's circumference.

19. (Currently Amended) ~~Bone~~The bone implant according to ~~any one of claims 1 to 18, characterized in that it comprises claim 1, further comprising a hollow space (26) and a piston (42), said piston being~~ which is insertable into a proximal opening of the hollow space (26).

20. (Currently Amended) ~~Bone~~The bone implant according to ~~the claim 19, characterized in that wherein,~~ on a proximal end (43) of the piston (42) and/or round the proximal opening of the hollow space (26), means for an insulating connection between piston (42) and implant are provided.

21. (Currently Amended) ~~Bone~~The bone implant according to ~~any one of claims 1 to 20, characterized in that it claim 1, wherein said implant~~ carries an intermediate element (52) on a proximal end region.

22. (Currently Amended) ~~Bone~~The bone implant according to claim 21, ~~characterized in that wherein~~ the intermediate element (52) is connected to the implant by a loose fit connection and/or is equipped to be joined to a sonotrode (53) via a loose fit connection.

23. (Currently Amended) ~~Bone~~The bone implant according to ~~any one of claims 1 to 22, characterized in that it claim 21, wherein said implant~~ is a dental implant (10).

24. (Currently Amended) ~~Bone~~The bone implant according to claim 23, ~~characterized in that it comprises~~further comprising, in addition to a root portion (11), a crown portion (12), an abutment (30) or means (20) for fastening an abutment, a crown (19), a bridge or a set of dentures.

25. (Currently Amended) ~~Bone~~The bone implant according to ~~any one of claims 1 to 22, characterized in that it~~claim 1, wherein the bone implant is the a shaft of a joint prosthesis.

26. (Currently Amended) ~~Bone~~The bone implant according to ~~any one of claims 1 to 22, characterized in that it~~claim 1, wherein the implant is adapted is designed to bridge a bone defect.

27. (Currently Amended) ~~Implantation~~An implantation set comprising a bone implant according to ~~any one of claims 1 to 26~~claim 1 and at least one processing tool (58), which is adapted in shape to the implant portion to be implanted, and/or an intermediate element (52), which is adapted in shape to a proximal end region of the implant.

28. (Currently Amended) ~~Method~~A method for producing a bone implant according to ~~any one of claims 1 to 26~~claim 1, which said bone implant is implanted in a cavity as a substitute for a part of a bone or a tooth, which cavity is ~~pre-~~given~~pre-existing~~ or is to be created and has an osseous cavity wall (K), wherein the method comprises the steps of:

a measuring step in which the bone part or tooth (1) to be substituted and/or the pre-given cavity, or a given bone structure in the area of the cavity to be created, are measured to generate measuring data imaging the bone part, the tooth (1), the cavity, or the bone structure,

a data processing step in which the measuring data are processed, and

a production step in which the bone implant (10) is produced based on the processed measuring data,

~~characterized in that~~ wherein, in the data processing step, the implant portion to be implanted is equipped with cutting edges (14) being dimensioned in such a way that they are at least partly lodged in the cavity wall after implantation, and with structures to receive portions of the liquefiable material (M).

29. (Currently Amended) ~~Method~~ The method according to claim 28, ~~characterized in that~~ wherein, in the measuring step, a three-dimensional image or one or several two-dimensional images are recorded.

30. (Currently Amended) ~~Method~~ The method according to claim 28 ~~or 29~~, ~~characterized in that~~ wherein, in the data processing step, a hollow space (26) and openings (27) connecting the surface of the implant portion to be implanted with the hollow space (26) are constructed.

31. (Currently Amended) ~~Method~~ The method according to ~~any one of claims 28 to 30~~, ~~characterized in that~~ claim 28, wherein, in the data processing step, axially extending furrowing or cutting structures (21) are constructed on the implant

portion to be implanted, which structures are dimensioned in such a way that they reach at least partially into the cavity wall after implantation.

32. (Currently Amended) ~~Method~~ The method according to ~~any one of claims 28 to 31, characterized in that~~ claim 28, wherein, in the data processing step, additional data are produced for the ~~production~~ production of a processing tool (58) adapted to the implant portion to be implanted.

33. (Currently Amended) ~~Method~~ The method according to ~~any one of claims 28 to 32, characterized in that~~ claim 28, wherein, in the data processing step, additional data are produced for the ~~production~~ production of an intermediate element (52) adapted to the proximal end region of the implant.

34. (Currently Amended) ~~Method~~ The method according to ~~any one of claims 28 to 33, characterized in that~~ claim 28, wherein, in the data processing step, structures with an osseointegrative effect are constructed.

35. (Currently Amended) ~~Method~~ The method according to ~~any one of claims 28 to 34, characterized in that~~ claim 28, wherein the bone implant is a dental implant (10), and ~~that the tooth (1) to be substituted and/or the alveolus (57) are measured prior to extraction of the tooth (1) to be substituted.~~

36. (Currently Amended) ~~Method~~ A method for the implantation of a bone implant according to ~~any one of claims 1 to 26~~ claim 1, wherein the bone implant is

positioned in a cavity, which is pre-given or to be created and has an osseous cavity wall, ~~characterized in that comprising the steps of,~~ on positioning the implant, lodging the cutting edges (14) ~~are lodged in the cavity wall (K), and that by~~ impingement with mechanical oscillations, liquefying at least a part of the liquefiable material (M) ~~liquefies and is pressed~~ pressing the liquefied liquefiable material into the cavity wall.

37. (Currently Amended) ~~Method~~ The method according to claim 36, ~~characterized in that wherein,~~ for the impingement of the implant with mechanical oscillations, the implant is coupled to an excited element ~~in such a way that,~~ of the oscillations, only those components pushing the implant into the cavity are transmitted to the implant.

38. (Currently Amended) ~~Method~~ The method according to the claim 37, ~~characterized in that wherein~~ the exciting element is a sonotrode (53) of an ultrasonic device or an intermediate element (52) which is able to be coupled to the sonotrode (53).

39. (Currently Amended) ~~Method~~ The method according to ~~any one of~~ claims 36 to 38, ~~characterized in that~~ claim 36, wherein the implant comprises surface ranges (16) of the liquefiable material and ~~that the implant is positioned in~~ the cavity by ~~means of~~ mechanical oscillations.

40. (Currently Amended) ~~Method~~ The method according to ~~any one of claims 36 to 38, characterized in that claim 36, wherein~~ the implant comprises a hollow space (26), in which the liquefiable material (M) is positioned or is able to be positioned, ~~that wherein~~ the implant is positioned in the cavity without impingement by mechanical oscillations or with impingement by mechanical oscillations but not including the liquefiable material, and ~~that then~~ the liquefiable material positioned in the hollow space (26) is impinged by mechanical oscillations and pressed against the distal end of the implant.

41. (Currently Amended) ~~Method~~ The method according to claim 40, ~~characterized in that wherein,~~ prior to the impingement of the liquefiable material by mechanical oscillations and after positioning the implant in the cavity, the position of the implant is checked and adjusted if necessary.

42. (Currently Amended) ~~Method~~ The method according to claim 40 or 41, ~~characterized in that wherein~~ a piston (42) is used for the impingement and pressing of the liquefiable material and the piston (42) is then tightly connected with the implant by the effect of the mechanical oscillations.

43. (Currently Amended) ~~Method~~ The method according to ~~any one of claims 36 to 42, characterized in that claim 36, wherein~~ the implant is conical and comprises steps (13), and ~~that wherein,~~ prior to the positioning of the implant, shoulders (13') adapted to the steps (13) are fashioned in the cavity wall (K).

44. (Currently Amended) ~~Method~~ The method according to claim 43, ~~characterized in that wherein, a processing tool (58) is used to for fashioning fashion~~ the shoulders (13'), ~~a processing tool (58) is used, which is said processing tool~~ being adapted to the implant portion to be implanted.

45. (Currently Amended) ~~Method~~ The method according to ~~any one of~~ claims 36 to 44, characterized in that claim 36, wherein the bone implant is a dental implant (10) and ~~that~~ the implantation is performed immediately after extraction of the tooth (1) to be substituted.